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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,831	06/01/2004	Boris I. Tsenter		4663
40599	7590	10/20/2005		
BORIS TSENER 1985 GLENEVES DRIVE ROSWELL, GA 30076			EXAMINER GRANT, ROBERT J	
			ART UNIT 2838	PAPER NUMBER

DATE MAILED: 10/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/709,831

Applicant(s)

TSENTER, BORIS I.

Examiner

Robert Grant

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 24-26 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6-1-04 1 page.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Lundquist (US 6,624,612).

As to Claim 11, Lundquist discloses a method of Li-based battery equalization in process of battery discharging, wherein individual Lithium cell is periodically connected to battery Lithium cell having minimum discharging voltage until voltage of two cells is getting equal to dynamically preselected voltage (Column 4, lines 50-59).

As to Claim 12, Lundquist discloses a method of Li-based battery equalization in process of battery charging, wherein individual Lithium cell is periodically connected to battery Lithium cell having maximum charging voltage until voltage of two cells is getting equal to dynamically preselected voltage (Column 4, lines 50-59).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,2, 4-6, 8-10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al. (US 6,683,440) in view of Eguchi (US 5,929,593).

As to Claim 1, Kawakami discloses a method of charging Li-based batteries by constant current and then by constant voltage to minimum current (Column 8, lines 37-41), with following operations: a. Measurement of battery ohmic resistance (Column 9, lines 36-46), and setting of minimum charging current depending on battery ohmic resistance (figure 6(3)). Eguchi discloses setting of battery overvoltage protection value (Column 6, lines 5-16). It would have been obvious to a person having ordinary skill in the art at the time of this invention to combine the teaches of Kawakami and Eguchi and set the minimum charging current based upon the overvoltage protection value and battery ohmic resistance in order to charge the battery in an efficient manner.

As to Claim 2, which is dependent upon claim 1, Eguchi further discloses a method of charging Li-based battery, wherein said overvoltage protection is specified as difference between maximum voltage and instantaneous open-circuit voltage at battery terminals after 1 to 10 ms of current change (Eguchi column 8, lines 45-54).

As to Claim 4, which is dependent upon claim 1, Kawakami discloses a method of charging Li-based battery of claims 1, wherein maximum voltage, V_{max} , ranges between 4.0 and 4.2 V per cell (Column 10, line 56).

As to Claim 5, which is dependent upon claim 1, Kawakami discloses a method of charging Li-based battery, wherein constant voltage is instantaneous open-circuit voltage (Column 5, lines 26-36).

As to Claim 6, which is dependent upon claim 1, Kawakami discloses a method of charging Li-based battery, wherein constant voltage equals maximum voltage (Column 5, lines 26-36).

As to Claim 8, Eguchi discloses a method of charging Li-based battery of claim 1, and further discloses wherein minimum overvoltage protection is 0 to 50 mV (Column 9, lines 35-38).

As to Claim 9, Eguchi discloses a method of charging Li-based battery of claim 1, and further discloses wherein tolerance of supporting constant voltage has to be less than minimum overvoltage protection (Column 11, lines 55-57).

As to Claim 10, Kawakami discloses a method of charging Li-based batteries of claims 1, and further discloses wherein the minimum charging current reaches 0.6-0.05C rate (Figure 6(1)).

As to Claim 16 Kawakami discloses Li-based battery control method that contains a. Measurement of battery voltage (Column 5, lines 26-35), b. Measurement of ohmic resistance (Column 9, lines 36-46), c. Measurement of chemical resistance (Column 4, lines 47-56). Eguchi disclose a measurement of open-circuit voltage (Column 10, lines 5-16). It would have been obvious to a person having ordinary skill in the art at the time of this invention to combine the teachings of Kawakami with those of Eguchi, in order to have a better understanding of where possible drains, and lack of acceptance of charger are occurring in the charging system.

3. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami in view of Eguchi as applied to claim 1 above, and further in view of Ostergaard et al. (US 5,994,878).

As to Claim 3, Kawakami in view of Eguchi disclose the method of charging Li-based battery of claim 1. Kawakami and Eguchi do not expressly disclose wherein minimum charging current is a ratio of overvoltage protection and battery ohmic resistance. Ostergaard discloses wherein said minimum charging current is chosen as ratio of minimum overvoltage protection to battery ohmic resistance (Column 9, lines 4-10). It would have been obvious to a person having ordinary skill in the art at the time of this invention to use the teachings of Ostergaard and make the value a ratio, and therefore make computations easier.

As to Claim 7, Kawakami in view of Eguchi disclose the method of charging Li-based battery of claim 1. Kawakami and Eguchi do not expressly disclose the further limitations of claim 7. Ostergaard discloses wherein constant voltage equals maximum voltage plus product of minimum charging current and ohmic resistance (Column 9, lines 4-10). It would have been obvious to a person having ordinary skill in the art at the time of this invention to use the teachings of Ostergaard and use this method to find the actually voltage being applied to the battery.

4. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundquist (US 6,624,612) in view of Gartstein et al (US 6,163,131).

As to Claim 13, Lundquist discloses a method of Li-based battery equalization, (column 4, lines 50-59) Gartstein teaches of electrochemical cell types and voltage outputs. (Column 18, Lithium SOCl₂ cells are 3.6 volts, and column 19 Nickel metal hydride cells are 1.2 volts. Therefore in order to have the cells so that they are equivalent voltages for balancing, it would have been obvious to a person having ordinary skill in the art to use three nickel metal hydride cells in series, and one lithium cell in parallel.) It therefore would have been obvious to a person having ordinary skill in the art at the time of this invention to combine the teachings of Gartstein and Lundquist and have three series-connected Ni-based batteries are connected in parallel to each Li-based cell, and Ni-based cells are part of charging device, in order to allow cell balancing to occur with cells of different chemical make up.

As to Claim 14, Lundquist discloses a method of Li-based battery equalization with the use of primary cells and a storage cell (column 4, lines 50-59) Gartstein teaches of electrochemical cell types and voltage outputs. (Column 18, Lithium SOCl₂ cells are 3.6 volts, and column 19 Nickel metal hydride cells are 1.2 volts. Therefore in order to have the cells so that they are equivalent voltages for balancing, it would have been obvious to a person having ordinary skill in the art to use three nickel metal hydride cells in series, and one lithium cell in parallel.) It therefore would have been obvious to a person having ordinary skill in the art at the time of this invention to combine the teachings of Gartstein and Lundquist and each Lithium cell permanently contains three series-connected Ni-based cells, wherein Li-based cell and Ni-based

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cells have parallel connection, in order to create a power source consisting of cells with a different chemical make up.

5. Claims 17, 19, 20, 22, 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundquist in view of Gartstein as applied to claim 14 above, and further in view of Kawakami et al.

As to Claim 17, Lundquist in view of Gartstein disclose the battery control method of claim 14. Kawakami discloses wherein ohmic resistance is measured as ratio of two voltage differences corresponding to two current differences measured (Column 8, lines 32-65). Lundquist, Gartstein in view of Kawakami disclose the claimed invention except for the measurements being taken place in 1- to 10-ms interval. It would have been obvious to one of ordinary skill in the art at the time his invention was made to use this time interval, since it has been held that where the general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to Claim 19, Lundquist in view of Gartstein disclose the battery control method of claim 14. Kawakami discloses wherein chemical resistance is measured as ratio of two voltage differences corresponding to two current differences (Column 8, lines 32-65). Lundquist, Gartstein in view of Kawakami disclose the claimed invention except for the measurements being taken place prior to 10 ms and after 150 ms of current change. It would have been obvious to one of ordinary skill in the art at the time his invention was made to use this time interval, since it has been held that where the general

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conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to claim 20, which is dependent upon claim 14, Kawakami further discloses battery control method of claim 14, wherein one of two currents is zero (column 11, lines 9-13).

As to Claim 22, which is dependent upon claim 14, Kawakami further discloses a battery control wherein nonstationary open-circuit voltage is used to recognize battery state-of-charge (Figure 1, steps 10 and 11).

As to Claim 24, which is dependent upon the above rejected claims, Gartstein discloses battery make up of Li-ion battery (Column 18, lines 55-67 and Column 19, lines 1-20). It would have been obvious to use a Li-ion battery for its voltage characteristics.

As to Claim 25, which is dependent upon the above rejected claims, Gartstein discloses battery make up of Li polymer battery (Column 18, lines 55-67 and Column 19, lines 1-20). It would have been obvious to use a Li polymer battery for its voltage characteristics.

As to Claim 26, which is dependent upon the above rejected claims, Gartstein discloses battery make up of metallic Li battery (Column 18, lines 55-67 and Column 19, lines 1-20). It would have been obvious to use a metallic Li battery for its voltage characteristics.

6. Claim 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundquist as applied to claim 11 above, and further in view of Kawakami et al.

As to Claim 15, which is dependent upon claim 11, Lundquist does not disclose the charging method of constant current, constant voltage charging as described in this claim. Kawakami discloses a method of charging Li-based battery by constant current, and constant voltage, wherein charging is interrupted when charging current reaches stationary value (Column 11, lines 9-13). It would have been obvious to a person having ordinary skill in the art at the time of this invention to combine the charging method as taught by Kawakami with the balancer as taught by Lundquist in order to effectively charge the cells and keep them in a balanced state with each other.

As to Claim 18, Kawakami discloses the battery control method of claim 15, wherein one of two currents is zero (Column 11, lines 9-13).

7. Claim 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Lundquist in view of Gartstein as applied to claim 14 above, and further in view of Ostergaard et al. (US 5,994,878).

As to Claim 21, Lundquist in view of Gartstein disclose the battery control method of claim 14. Ostergaard discloses wherein the nonstationary open-circuit voltage is defined as difference between terminal voltage and product of sum of ohmic and chemical resistances, and current (Column 9, lines 4-10). It would have been obvious to a person having ordinary skill in the art at the time of this invention to combine the teachings of Ostergaard with Lundquist in view of Gartstein the that the charging

voltage takes into account all the resistive factors of the battery, and this allows the proper voltage to be applied to the battery.

Allowable Subject Matter

8. Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: Claim 23 recites, inter alia, electrical double layer capacity is measured by sampling chemical polarization for 10 to 15 ms after current interruption, and obtaining ratio of product of current and time interval to chemical polarization difference for this time interval. The art of record does not disclose, teach, or suggest the above limitation, nor would it have been obvious to a person having ordinary skill in the art to modify the art of record to disclose to above limitation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Grant whose telephone number is 571-272-2727. The examiner can normally be reached on M-F 8:30-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RG



Adolf Deneke Berhane
Primary Examiner